IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Carl G. de Marcken et al.	Art Unit	: 3626
Serial No.	: 10/098,580	Examiner	: Linh Giang Le
Filed	: March 15, 2002	Conf. No.	: 6894
Title	: METHOD AND APPARATUS FOR PROVIDING AVAILABILITY OF AIRLINE SEATS		

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APPEAL BRIEF ON BEHALF OF CARL G. DE MARCKEN ET AL.

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(1) Real Party in Interest

The real party in interest in the above application is ITA Software, Inc.

(2) Related Appeals and Interferences

Appellant is not aware of any appeals or interferences related to the above-identified patent application.

(3) Status of Claims

This is an appeal from the decision of the Examiner in a final Office Action dated August 5, 2008, rejecting claims 28-48 and 56-82, all of the claims of the above application. The claims have been twice rejected. Claims 28-48 and 56-82 are the subject of this appeal

(4) Status of Amendments

All amendments have been entered. Appellant filed a Notice of Appeal on **December 4, 2008**.

(5) Summary of Claimed Subject Matter

Claim 28

Claim 28 is directed to a method executed in a travel planning system for providing a predicted answer in response to a seat availability query from a user. *"Referring now to FIG. 4, the predictor process 90 that uses the database 70 to provide predicted availability answers is shown."* [1]

[1] Specification page 11, lines 5-8

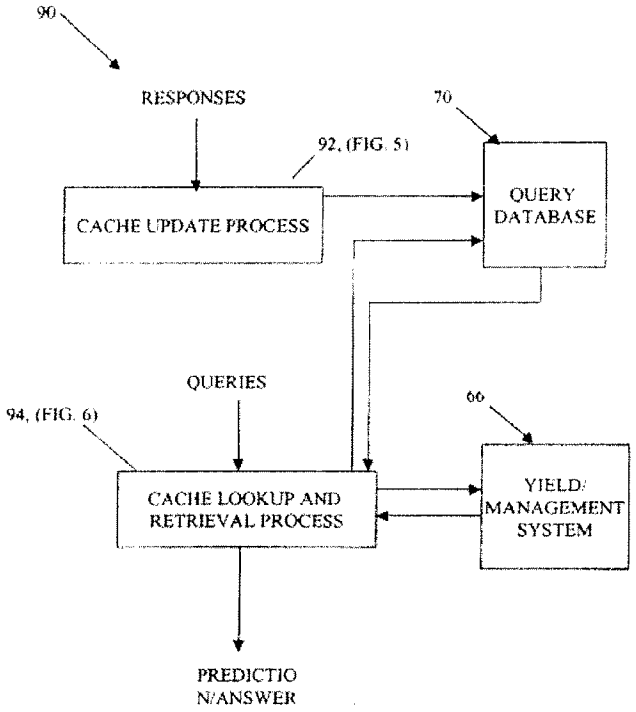

FIG. 4

Inventive features of claim 28 include retrieving a stored query from a cache that stores seat availability queries and answers to seat availability queries stored from previously completed seat availability queries sent to revenue management systems. *"The predictor 90 also includes a look-up and retrieval process 94 that interfaces with the query database 70 ... In response to a query, the look-up and retrieval process 94 produces either a prediction for the answer of the query or an actual answer depending upon whether the look-up and retrieval process retrieves an answer from the database 70 ..."* [2] *"The database 70 stores availability queries and answers ..."* [3]

Inventive features of claim 28 also include determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query. *"The look-up and retrieval process 94 will look up 112 the received query in the query database 70 by attempting to match the query*

[2] Specification page 11, lines 15-23.
[3] Specification page 9, lines 10-11.

fields such as airline, flight number/numbers, date, trip origin and destination, sale location and agency. If a stored query is found 114 in the query database 70 that matches the received query or which is substantially close in characteristics to the received query." [4]

Inventive features of claim 28 also include retrieving an answer corresponding to the stored query matching the seat availability query from the cache. *"... the process 94 will retrieve 116 the stored answer."* [5]

Inventive features of claim 28 also include determining whether the retrieved answer is not stale. *"The process 94 will determine if the stored answer is stale 118;"* [6]

Inventive features of claim 28 also include and if the retrieved answer is not stale. returning the retrieved answer as the predicted answer to the user's seat availability query. *"If the answer is not stale, then the look-up and retrieval process 94 will return 120 the stored answer as a prediction of the availability of a seat on a particular flight according to the availability query."* [7]

Claim 56

Claim 56 is directed towards a computer program product residing on a computer readable medium for use by a travel planning system *"Referring now to FIG. 1, a travel planning system 10 is shown. The travel planning system 10 can be used with various forms of travel ... It includes a server computer 12 having a computer memory or storage media 14 storing a server process 15."* [8] *"The server process 18 also includes an availability predictor 65 that is used to determine airline seat availability."* [9]

The remaining features of claim 56 are analogous to those of claim 28 and are supported by at least the same cited passages from the specification.

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[4] Specification page 12, lines 16-22.
[5] Specification page 12, lines 22-23.
[6] Specification page 12, lines 23-24.
[7] Specification page 12, lines 28-31.
[8] Specification page 6, lines 5-10.
[9] Specification page 8, lines 26-27.

Claim 71

Claim 71 is directed to a computer system for providing a predicted answer in response to a seat availability query from a user *"Referring now to FIG. 1, a travel planning system 10 is shown. The travel planning system 10 can be used with various forms of travel ... It includes a server computer 12 having a computer memory or storage media 14 storing a server process 15."* [10] The computer system includes a processor and a computer readable medium storing a computer program product *The travel planning system 10 can be used with various forms of travel ... It includes a server computer 12 having a computer memory or storage media 14 storing a server process 15."* [11]

The remaining features of claim 71 are analogous to those of claim 28 and are supported by at least the same cited passages from the specification.

(6) The Ground of Rejection to be Reviewed on Appeal

Claims 28-48 and 56-82 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bailis et al. (U.S. Patent No. 5,999,946).

(7) Argument

Obviousness

"It is well established that the burden is on the PTO to establish a prima facie showing of obviousness, *In re Fritsch*, 972 F.2d. 1260, 23 U.S.P.Q.2d 1780 (C.C.P.A., 1972)."

"... when evaluating the scope of a claim, every limitation in the claim must be considered. USPTO personnel may not dissect a claimed invention into discrete elements and then evaluate the elements in isolation. Instead, the claim as a whole must be considered. See, e.g., *Diamond v. Diehr*, 450 U.S. 175, 188-89, 209 USPQ 1, 9 (1981) ("In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis. This is particularly true in a process claim because a new combination of steps in a process may be patentable even though all

[10] Specification page 6, lines 5-10.
[11] Specification page 6, lines 5-10.

the constituents of the combination were well known and in common use before the combination was made.")." MPEP §2106.

"The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

> Although the Commissioner suggests that [the structure in the primary prior art reference] could readily be modified to form the [claimed] structure, "[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Laskowski*, 10 U.S.P.Q. 2d 1397, 1398 (Fed. Cir. 1989).

"It is well established that there must be some logical reason apparent from the evidence or record to justify combination or modification of references. *In re Regal*, 526 F.2d 1399 188, U.S.P.Q.2d 136 (C.C.P.A. 1975).

When evaluating claims for obviousness under 35 U.S.C. 103, all the limitations of the claims must be considered and given weight ... *Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983) *aff'd mem.* 738 F.2d 453 (Fed. Cir. 1984).

Introduction

Before discussing how Appellant's claims distinguish over the art it may be helpful to the Board if Appellant addresses some general points concerning the subject matter of this application.

Described are highly computationally efficient techniques for determining airline seat availability information for use in travel planning and travel reservation systems. While it is desirable to look at many possible flight combinations to fulfill a user's travel planning query, it is undesirable to return large numbers of flights for which no seats are in fact available. However, there is a computational expense as well as an economic expense involved in obtaining seat availability information.[12] The techniques make it possible to determine seat availability for many possible flight combinations, e.g., on the order of thousands or more – an undertaking that

[12] Specification page 3, lines 4-6.

would be prohibitively costly and time consuming with conventional methods performed by travel agents and computer reservation services (CRS).

Rather than query an airline's revenue management system for seat availability for each possible flight combination retrieved in response to a user's query, the techniques attempt to predict seat availability by accessing a database storing previous availability queries and their corresponding answers. The techniques predict seat availability for flights that satisfy the user's availability query by determining whether the user's availability query corresponds to or is similar to a query stored in the database. If a sufficient match is determined, the stored answer is retrieved otherwise an actual availability query is sent to the airline's Reservation Management System (RMS). The technique substitute inexact matches as predictions of availability answers for actual availability responses from an airline's RMS.

Claims 28-48 and 56-82 are not obvious over Bailis et al. (U.S. Patent No. 5,999,946).

Claims 28, 30, 32, 56, 58, 59, 71, and 73

For the purposes of this appeal only, claims 28, 30, 32, 56, 58, 59, 71, and 73 stand or fall together.

Claim 28, which is representative of this group, covers "a method executed in a travel planning system for providing a predicted answer in response to a seat availability query from a user." The inventive features of claim 28 include "retrieving a stored query from a cache that stores seat availability queries and answers to seat availability queries stored from previously completed seat availability queries ... determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query ... retrieving an answer corresponding to the stored query matching the seat availability query ... determining whether the retrieved answer is not stale; and if the retrieved answer is not stale ... returning the retrieved answer as the predicted answer to the user's seat availability query."

Preamble limitation is entitled to patentable weight

Bailis does not teach the combination of features recited in claim 28. For example, Bailis does not disclose or suggest "providing a predicted answer in response to a seat availability query from a use." As argued previously,[13] there is no aspect of prediction involved in Bailis's system. Rather, Bailis's system is simply a database a management system that uses a cache to speed up processing. In response to Appellant's argument, the Examiner has simply disregarded the claimed feature of "providing a predicted answer" as not being entitled to patentable weight because the feature occurs in the preamble. In particular, the Examiner argues the following:

> **A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See In re c, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). The method steps in claim 28 of retrieving and matching queries do not depend upon the preamble for completeness.**[14]

Contrary to the Examiner's assertions, however the preamble of claim 28 is indeed required by the features recited in the body of the claim. For example, the term "predicted answer" is first introduced in the preamble and later referenced in the last limitation of the claim, as well as by the features recited in dependent claim 37. Furthermore, the "user's seat availability query," is first introduced in the preamble and referenced throughout the body of the claim. So clearly the preamble is necessary for "completeness" and does not "merely recited the purpose of the process, which was fully set forth in the body of the claim" because it provides antecedent basis for essential features recited in the body of the claim. When the limitations in the body of the claim "rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed.Cir.2003).

Bailis nowhere discloses or suggests providing a predicted answer in response to a query. Bailis does not seek a prediction of an answer to a query, but rather the actual answer to the query.

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[13] Appellant's Amendment on page 15.
[14] Final Office Action at page 3, item 7(A).

Furthermore, the Examiner failed to read the preamble of claim 28 in the context of the entire claim. It has long been recognized that the determination of whether preamble recitations are structural limitations or mere statements of purpose or use "can be resolved only on review of the entirety of the [record] to gain an understanding of what the inventors actually invented and intended to encompass by the claim." *Corning Glass Works*, 868 F.2d at 1257, 9 USPQ2d at 1966. As evident from the Appellant's specification and the combination of features recited in claim 28, providing a predicted availability answer to a seat availability query is at the heart of the invention. Indeed, providing a prediction is the *sine qua non* of the feature "determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query." For this reason, and for the reasons stated above, the preamble of claim 28 is entitled to patentable weight and consideration.

Previous queries are not stored in the cache with Bailis answers

Contrary to the Examiner's remarks, Bailis also does not teach "retrieving a stored query from a cache that stores seat availability queries and answers to seat availability queries ...," as recited in claim 28. Clearly, this feature requires that the cache stores previous seat availability queries. Bailis however, does not teach storing previous queries in the cache. Rather, Bailis only teaches storing query results, i.e., the answers to the queries, in the cache:

> **Another aspect of the present invention addresses query concentration. According to this aspect of the invention, query results are stored by the database engine in local cache.**[15]

The Examiner has yet to specifically point out where Bailis teaches a cache that stores the query for seat availability answers, as well as, the answers. That is, in claim 28, the cache stores a seat availability answer along with the query that resulted in that answer. A subsequent query for seat availability data is compared to the query to see if the queries are sufficiently close to

[15] Bailis at col. 4, lines 46-49.

allow the stored answer to be used as a prediction for how the availability system would actually answer the subsequent query.

In order to address the glaring deficiency in the Examiner's reasoning pertaining to storing the queries, the Examiner resorts to a fanciful interpretation of Bailis that results from improper hindsight reconstruction. The Examiner attempts to show that the queries are stored with the data, by arguing:

> **Bailis teaches supplying subsequent identical queries with data from cache instead of re-executing the search of the entire database (Bailis; Col. 4, lines 55-65). Thus, one of ordinary skill in the art would understand this to mean previous queries would be stored cache. Previous queries would have to be stored in order for the system to determine if a subsequent query was identical.** [16]

However, this reasoning does not square with how Bailis teaches "query concentration." Bailis describes that: "**For as long as the data is valid, the database engine supplies subsequent, identical queries with the data from cache instead of reexecuting the search of the database that originally produced the cached results.**"[17] So, unlike the Examiner proffered reasoning, Bailis does not say that the queries are stored with the data in the cache, but that subsequent, identical queries will be serviced with data from the cache, which is how a conventional cache works in this regard. Therefore, Bailis neither describes nor suggests storing of the queries along with the data. From Bailis there is absolutely no basis for the Examiner to argue that previous queries are stored along with the data in the cache.[18]

Appellant contends that because the Examiner did not explicitly identify where the claimed feature of retrieving a stored query can be found in Bailis, in effect, the Examiner either reasons that the feature is inherent in Bailis' system or relies on Official Notice supported by personal knowledge without supporting documentary evidence. In either case, the Examiner's conclusion that "**previous queries would have to be stored**" in Bailis' system is an erroneous simplification of the recited feature.

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[16] Final Office Action at page 4, item (B).
[17] Bailis at col. 4, lines 55-58.
[18] Bailis clearly discusses how subsequent, identical queries are serviced from the cache as long as the data is valid the query is serviced from the cache. See Bailis "The validity of the cached data may be determined by the amount of time that has passed since the original query. This time limit may be programmably variable." Col. 2, lines 44-46.

To properly establish inherency or assert an Official Notice based on personal knowledge without supporting documentation, the Examiner must provide a rationale or evidence showing that the feature is necessarily present in the cited prior art.[19, 20] The Examiner has not provided the requisite rationale or evidence to properly establish via inherency or Official Notice that Bailis teaches retrieving a stored query from a cache.

The Examiner's reasoning that **"previous queries would have to be stored in order for the system to determine if a subsequent query was identical"** is based on a mischaracterization and misinterpretation of Bailis teachings at Col. 4, lines 55-65; which are reproduced below for reference:

> **For as long as the data is valid, the database engine supplies subsequent, identical queries with the data from cache instead of reexecuting the search of the database that originally produced the cached results.**

Supplying subsequent identical queries with data from cache, as taught in Bailis, does not necessitate actually determining whether a subsequent query is identical to a previous query, nor does it necessitate storing the previous queries in the cache with the answers to those queries. Rather, the above passage only requires the *results* from previous queries to be stored. Contrary to the Examiner's reasoning, Bailis' system may supply the stored results to live queries that are identical to previous queries without storing the previous queries with the results in the cache (database).

Bailis' system either returns answers that satisfy the query if the answers already exist in the cache or searches the database if the answers to the query are not found in the cache. If a live query were identical to a previous query, the cached answer corresponding to the previous query

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[19] To properly establish inherency, rationale or evidence tending to show inherency must be provided. The extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

[20] Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. As noted by the court in *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as to defy dispute" (citing *In re Knapp Monarch Co.*, 296 F.2d 230, 132 USPQ 6 (CCPA 1961)).

would necessarily satisfy the live (identical) query, and thus the cached result is supplied without executing a search of the database. In this scenario, the system does not determine whether the live query is identical to a previous query, nor is it required to store previous queries with answers in the cache. All that is required is that the results of execution of one of those previously queries still is resident in the cache.

Appellant disagrees with the Examiner's finding that "previous queries would have to be stored" in Bailis.[21] As shown above, Bailis's system supplies subsequent identical queries with data from cache without storing the previous queries with the answers in the cache. Moreover, if Bailis required storing of previous queries in the cache in order for the cache to operate as the examiner reasons, then that would mean that Bailis omitted essential teachings from its own disclosure rendering the reference in operative. It would appear to be improper of the Office to take such a position. Accordingly, the Examiner has not fulfilled the requirements for relying on inherency or taking Official Notice that Bailis' cache would necessarily store previous queries when no such disclosure or suggestion of this feature can be found in Bailis.

Request for documentary evidence

Accordingly, Appellant requests that the Examiner furnish documentary evidence to support the assertion that previous queries would have to be stored in Bailis cache along with the answers to those queries.[22] The Examiner's reliance on personal knowledge without documentary evidence is not permitted as a reasonable basis for a rejection under U.S.C. 103(a).[23] Furthermore, the burden is on the Examiner to provide the requisite evidence so that the Appellant may be given a full chance to respond to and challenge the Examiner's rejection.

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[21] "To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art." MPEP §2144.03(C).

[22] "When a rejection in an application is based on facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible, and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons." 37 CFR 1.104(d)(2). MPEP §2144.03(C).

[23] Any rejection based on assertions that a fact is well-known or is common knowledge in the art without documentary evidence to support the examiner's conclusion should be judiciously applied ... It is never appropriate to rely solely on common knowledge in the art without evidentiary support in the record as the principal evidence upon which a rejection was based. See *Zurko*, 258 F.3d at 1386, 59 USPQ2d at 1697; *Ahlert*, 424 F.2d at 1092, 165 USPQ 421. MPEP §2144.03(C).

Claim 28 requires inexactness in matching of query fields

Claim 28 also requires the feature of "determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query."

Bailis, by contrast, only describes and suggests an exact match: **"...the database engine supplies subsequent, identical queries with the data from cache ..."**[24] In Bailis there is no provision to use a query in which "at least some fields in the stored seat availability query either match or are substantially close in characteristics." Furthermore, Bailis would not provide such logic as it would likely result in havoc in the phone system, e.g., placing a call to a wrong phone number that may be similar to the phone number in a user's query; assigning one subscriber's phone number to a different subscriber having a similar phone number; or other similar illogical consequences.

The operation of Bailis' telecommunication system including its conventional database and cache operations clearly require exactness. The lack of exactness, if applied to Bailis, would lead to illogical and irrational consequences, thus rendering Bailis' system inoperable for its intended purposes.

Claims 29, 31, 57, and 72

For the purposes of this appeal only, claims 29, 31, 57, and 72 stand or fall together. Claim 29 is representative of this group of claims.

Claim 29 calls for "storing queries and answers from previously completed seat availability queries in the cache ... wherein storing queries includes storing one or more query fields for airline name, flight number, origination, destination, date of query, traveler nationality, point of purchase, frequent flyer status and seller data."

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[24] Bailis at col. 4, lines 55-58.

Bailis does not teach the feature of storing queries from previously completed seat availability queries in the cache, for the reasons provided above for claim 28. Nor is this feature inherent in Bailis or derivable from common knowledge. As Appellant reasons above, Bailis' system supplies subsequent identical queries with data from cache without storing previous queries in the cache. Thus, there is no reasonable basis for concluding that the feature is an inherent function in Bailis' database engine:

> In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Furthermore, the Examiner has improperly relied on personal knowledge as the sole basis for concluding that previous queries would have to be stored in Bailis' cache.

> It is never appropriate to rely solely on "common knowledge" in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based. *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697.

As shown above, Bailis' cache would not need to store previous queries to supply subsequent identical queries with data stored in the cache.

Claims 33, 60, and 74

For the purposes of this appeal only, claims 33, 60, and 74 stand or fall together. Claim 33 is representative of this group of claims.

Claim 33 calls for "approximately matching the query fields in the availability query to at least some of the query fields of a query stored in the cache database."

Bailis, by contrast, is only operable for returning answers for identical queries, i.e., a complete match: **"For as long as the data is valid, the database engine supplies subsequent, identical queries with the data from cache instead of reexecuting the search of the database that originally produced the cached results."**[25]

[25] Bailis at col. 4, line 56.

The Examiner applies the same argument for claim 31 to claim 33 even though these claims recite different features and are of different scope.[26] The Examiner essentially argues that Bailis' teachings of matching identical queries cover *approximately* matching query fields. The Examiner's reasoning is based on an incorrect assumption that approximate matching as recited in claim 33 could include exact matching, as taught in Bailis.

However, approximate matching as recited in claim 33, literally excludes exact matching, which is covered by dependent claim 32. Claim 33 depends on claim 28, which recites "determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query." In accordance with the 35 U.S.C. 112, fourth paragraph,[27] claim 33 necessarily includes the limitations of claim 28 and further limits the subject matter of claim 28, by requiring the match be an approximate match. Thus, claim 33 literally does not cover and logically cannot properly be construed to cover an exact match, otherwise claim 33 would not serve to further limit the scope of claim 28.

There is nothing in Bailis that discloses or suggests "approximate matching." Indeed, given the nature of the problem solved by Bailis, approximate matching would not appear to be desirable in operation of Bailis' described telecommunication system for at least the reasons provided earlier with respect to claim 28.

Claims 34-35, 61-62, and 75

For the purposes of this appeal only, claims 34-36, 61-63, and 75 stand or fall together. Claim 34 is representative of this group of claims.

Claim 34 recites that "...if the retrieved answer is stale, sending an actual availability query to an airline availability system ...returning the actual answer received from the airline availability system to the user; and storing the actual answer and query in the cache database of the availability predictor."

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[26] "As per claims 32 and 33, Applicant applies and incorporates the above response for claims 28 and 31." Final Office Action at page 5, item 10.

[27] "... a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers." 35 U.S.C. 112, fourth paragraph.

Bailis nowhere discloses or suggests determining if an answer retrieved from the cache is stale and sending an actual query to the system if the answer is stale. Rather, when retrieving a result from the cache, Bailis assumes that the result is valid:

> **... query results are stored by the database engine in local cache ... the query results may be saved as long as they are considered valid ... For as long as the data is valid, the database engine supplies subsequent, identical queries with the data from cache.** [28]

Accordingly, Bailis' process clearly does not determine whether a query result *retrieved* from the cache is valid. Rather, it determines whether the query results *stored* in the cache are valid, saving only those that are valid. When a result is eventually retrieved, it is already considered to be valid by virtue of it having been saved in the cache. There is nothing in Bailis to suggest that a cached result is checked for staleness after it has been retrieved from the cache.

The Examiner attempts to support the assertion that Bailis teaches the features of claim 34 with the following argument:

> **As per claim 34, Examiner submits that one of ordinary skill in the art would understand the process of querying, matching queries and sending an answer to be a continual process. The database system of Bailis would be suitable for use in any commercial database engine thus the process would be continual.**[29]

With all due respect, Appellant does not understand how the Examiner's argument that Bailis' database engine performs a "continual process" is in any way relevant to claim 34. Nowhere does claim 34 recite a "continual process." Nor was such a feature ever relied upon by Appellant during prosecution to distinguish claim 34 over Bailis. Even if Bailis could be construed to teach a continual process, which Appellant does not concede, such a construction of Bailis is irrelevant to the claimed feature of determining if an answer retrieved from the cache is stale and sending an actual query to the system if the answer is stale.

Claims 36 and 63

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[28] Bailis at col. 4, lines 47-57.
[29] Final Office Action at page 5, item 11.

For the purposes of this appeal only, claims 37-41, 64-68, and 76-80 stand or fall together. Claim 36 is representative of this group of claims.

Claim 36 calls for "determining a threshold time according to one or more query factors, said query factors including a date of a flight, an origin of a flight, a destination of a flight, a time of flight, a day of week per flight, a size of the airplane, an actual answer to a completed query that matches the seat availability query and an actual answer to a completed query that does not match the seat availability query."

In rejecting claim 36 over Bailis, the Examiner improperly accorded the query factor characteristics no patentable weight:

> **In the rejection of claim 36, the Examiner has not accorded patentable weight to the query factor characteristics recited in the claim because the Examiner believes that "the data specifically relating to flight travel is non functional descriptive matter ... [and] does not add to any functionality to the substrate of the method."[30]**

Appellant disagrees. Data that is functionally related to its substrate must be accorded patentable weight.

The Federal Circuit in *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994) set forth guidelines to be applied by the patent office in determining whether recited subject matter is functionally related to the substrate.[31]

After acknowledging that the Board of Patent Appeals and Interferences had reversed the Examiner's rejection of Lowry's data structure claims under 35 U.S.C. 101 because Lowry recited a memory, an article of manufacture and a class of invention specifically prescribed by 35 U.S.C. 101, the court turned to the Board's printed matter rejection of those claims. In reversing the Board, the Federal Circuit stated:

> More than mere abstraction, the data structures are specific electrical or magnetic *1584 structural elements in a memory. According to Lowry, the data structures provide tangible benefits: data stored in accordance with the claimed data

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[30] Final Office Action at pages 4-5, item 8.

[31] The Federal Circuit noted that: "Lowry disclosed a data structure accessible by many different application programs. Lowry's data structure was based upon the 'Attributive data model.' The Attributive data model represents complex information in terms of attributes and relationships between attributes." *Lowry* F.3d at 1582.

> structures are more easily accessed, stored, and erased. Lowry further notes that, unlike prior art data structures, Lowry's data structures simultaneously represent complex data accurately and enable powerful nested operations. In short, Lowry's data structures are physical entities that provide increased efficiency in computer operation. They are not analogous to printed matter. The Board is not at liberty to ignore such limitations.

Claim 36 is directed to a method that uses characteristics of the query factors, here in the problem domain of airline travel planning, to ascertain when to indicate that the stored results are stale. The claim therefore does not encompass non-functional descriptive material, because the data characteristics materially modify the nature of the processing performed by the claimed method. Moreover the data do not encompass non-functional descriptive material such as music, literature, art, photographs and mere arrangements or compilations of facts or data, because the features of claim 36 provide a functional interrelationship between the data and the substrate, i.e., method that examines the characteristics of the data in order to affect the processing in the method.

For example, the characteristics of the query factors influence the way in which the Appellant's claimed process determines whether a result is stale. As discussed above, claim 34, which claim 36 depends upon,[32] determines if a retrieved answer is stale. Bailis, by contrast, assumes that an answer retrieved from the cache is valid. The difference between Appellant's and Bailis' validation processes is at least partly a result of the different types of data stored in the caches. In this regard, the travel-planning query factors recited in claim 36 are subject to change frequently, and it is undesirable to return a flight combination for which one or more of those query factors are no longer valid.

Bailis' system, by contrast, processes queries for telecommunications data and validates data while it is stored in the cache, not after it is retrieved from the cache. Applying Bailis' validation method to seat availability data would increase the likelihood of providing a stale seat availability answers to a user because a stored seat availability answer that is initially determined to be valid could become stale before it is actually retrieved from the cache. However, Bailis nowhere discusses this potential drawback of its validation process so presumably this drawback

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[32] Claim 36 depends on claim 35 which depends on claim 34. Although claim 35 currently shows a dependence on claim 30, this is a typo and will be corrected later by Appellant after the Appeal.

is not an issue given the type of data, e.g., telecommunications data, processed by Bailis. Thus, the specific query factor characteristics recited in claim 36 have bearing on functional features recited in the claim, particularly determining staleness of answers, and indeed distinguish claim 36 over Bailis.

Claims 37-41, 64-68, and 76-80

For the purposes of this appeal only, claims 37-41, 64-68, and 76-80 stand or fall together. Claim 37 is representative of this group of claims.

Claim 37 calls for "determining that the retrieved answer from the cache database is stale; returning the retrieved answer as the predicted answer where the predicted answer includes a confidence factor corresponding to the predicted answer; and accepting the predicted answer, or not, based on the confidence factor."

The Examiner acknowledges that **"Bailis does not expressly teach including a confidence factor corresponding to the predicted answer."**[33] However, the Examiner has dismissed this feature as **"only being found in the non-functional data"**[34] and thus **"will not distinguish the claimed invention from the prior art in terms of patentability."**[35]

Applicant disagrees. The claimed confidence factor is functionally related to the method and therefore must be accorded patentable weight based at least on the rational of *In re Lowry* discussed above. Claim 37 uses the confidence factor to ascertain whether or not to accept the predicted answer as the answer to the user query. The confidence factor is indeed entitled to patentable weight, because it materially modifies the nature of the processing performed by the claimed method. Furthermore, the confidence factor does not encompass nonfunctional descriptive material such as music, literature, art, photographs and mere arrangements or compilations of facts or data. Rather, it is a factor that must be considered by the method in claim 37 to affect the remaining processing of the claim, e.g., accepting or not accepting the predicted answer. Thus, the features of claim 37 provide a functional interrelationship between the factor

[33] First Office Action at page 6, item 19.
[34] Id.
[35] Id.

and the substrate, i.e., method, which examines the confidence factor in order to affect the processing of the method.

Per claim 37, the Examiner further argues that **"the results of matching queries is not functionally affected by the type of data. Thus the determination of a confidence factor is also not functionally affected by the type of data either."**[36]

With all due respect, Appellant does not understand how the Examiner's foregoing arguments are germane to the issue of whether the confidence factor imparts functionality to the claimed method. Matching queries is nowhere recited in claim 37, nor has the Appellant argued that the matching is affected by the confidence factor. Rather, Appellant maintains that the recited feature of accepting or not accepting a predicted answer is functionally affected by the confidence factor. Furthermore, the type of the data to which the confidence factor corresponds has no import to Appellant's assertion that the confidence factor is indeed functionally related to the claimed method since the confidence factor materially affects the processing performed by the method.

Claims 42-44, 69, and 81

For the purposes of this appeal only, claims 42-44, 69, and 81 stand or fall together. Claim 42 is representative of this group of claims.

Claim 42 calls for "predicting the confidence factor from previously completed seat availability queries in response to a request for a confidence factor." The Examiner rejects claim 42 under the same rationale provided for the rejection of claim 37. In this regard, the Examiner acknowledges that **"Bailis does not expressly teach including a confidence factor corresponding to the predicted answer,"**[37] but dismisses the feature from as having no patentable weight for allegedly **"only being found in the non-functional data."**[38]

The Examiner has misapprehended claim 42. Claim 42 does not require "including a confidence factor corresponding to the predicted answer." Rather, Claim 42 recites "predicting the confidence factor from previously completed seat availability queries in response to a request for a confidence factor." [emphasis added]. Predicting a confidence factor is indeed a functional

[36] Final Office Action page pages 5-6, item 12.
[37] First Office Action at page 8, item 24.
[38] Id.

feature of the claimed method and such a feature has long been recognized to be entitled to patentable weight and consideration. See for instance, *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989).[39]

Bailis nowhere discloses or suggests predicting a confidence factor from previously completed seat availability queries in response to a request for a confidence factor. Furthermore, Bailis' would have no use for predicting a confidence factor since Bailis is concerned only with identical queries.

Claims 45-48, 70, and 82

For the purposes of this appeal only, claims 45-48, 70, and 82 stand or fall together. Claim 45 is representative of this group of claims.

Claim 45 requires that predicting "produces a confidence factor according to a model using as a factor in the model a threshold time, which if lapsed, indicates that the retrieved answer is considered stale."

Bailis does not teach the confidence factor as set out and admitted by the Examiner above. Bailis also does not use a model to indicate when the answer is considered stale. Rather, Bailis uses a timer to determine when an answer is no longer valid. Bailis also states that the duration of a time over which the timer counts (after which the answer is no longer considered valid) is determined **"empirically"**[40] or **"based on experience or observation alone often without due regard for system and theory"**[41] according to the ordinary English definition of the term. An empirical determination is clearly different from a determination based on a model.

The Examiner contends that the timer itself **"reads upon a model."**[42] This is a gross mischaracterization of the "model" recited in the claim, which according to Appellant's specification, receives one or more input factors and manipulates the factors to produce a

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[39] Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation. The determination of whether preamble recitations are structural limitations can be resolved only on review of the entirety of the application "to gain an understanding of what the inventors actually invented and intended to encompass by the claim."; *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989); MPEP §2111.02.

[40] Bailis at col. 4, lines 51-54.

[41] Merriam-Webster Dictionary Online; http://www.merriam-webster.com/dictionary/empirical.

[42] Final Office Action at page 6, item 13.

predicted outcome.[43] Examples of the recited model include: a linear or quadratic discriminator, factorial model, decision tree, decision list, neural network, sigmoidal network, Bayesian network, naive Bayesian network, Markov random field, maximum entropy model, exponential or log linear model, nearest neighbor model, radial basis model, and a support vector model.[44]

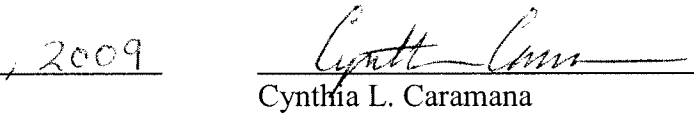
Bailis' timer, by contrast, is a device or a program that simply indicates or measures an elapsed duration of time and is in no way equivalent to the claimed model. As discussed above, the duration of time measured or indicated by Bailis' timer is nowhere disclosed or suggested to be determined using a model, but rather is determined empirically, i.e., based on observation or experience.

Conclusion

Appellant submits that for the above reasons claims 28-48 and 56-82 are allowable over the cited art. Therefore, the Examiner erred in rejecting Appellant's claims and should be reversed.

Respectfully submitted,

Date: February 3, 2009



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[43] Appellant's specification at page 17, lines 20-28.
[44] Appellant's specification at page 19, lines 13-17.

Appendix of Claims

Claims 1-27 are canceled.

28. A method executed in a travel planning system for providing a predicted answer in response to a seat availability query from a user, the method comprising:

retrieving a stored query from a cache that stores seat availability queries and answers to seat availability queries stored from previously completed seat availability queries sent to revenue management systems;

determining whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query;

retrieving an answer corresponding to the stored query matching the seat availability query from the cache;

determining whether the retrieved answer is not stale; and if the retrieved answer is not stale:

returning the retrieved answer as the predicted answer to the user's seat availability query.

29. The method of claim 28 further comprising:

storing queries and answers from previously completed seat availability queries in the cache; and

wherein storing queries includes storing one or more query fields for airline name, flight number, origination, destination, date of query, traveler nationality, point of purchase, frequent flyer status and seller data.

30. The method of claim 28 wherein storing answers further comprises:

storing one or more answer fields for booking codes and booking counts; and

assigning a data parameter to the stored answer wherein assigning includes one or more parameters for time, date, source and user characteristics.

31. The method of claim 28 wherein determining whether at least some of the fields of a stored query matches the user's seat availability query further comprises:

parsing the user's availability query into query fields; and

matching the query fields of the availability query to the query fields stored in the cache database.

32. The method of claim 28 wherein matching further comprises:

exactly matching the query fields in the availability query to the query fields of a query stored in the cache database.

33. The method of claim 28 wherein matching further comprises:

approximately matching the query fields in the availability query to at least some of the query fields of a query stored in the cache database.

34. The method of claim 28 wherein if the retrieved answer is stale, sending an actual availability query to an airline availability system that includes a revenue management algorithm and inventory management system;

returning the actual answer received from the airline availability system to the user; and

storing the actual answer and query in the cache database of the availability predictor

35. The method of claim 30 wherein determining whether the retrieved answer is not stale further comprises: retrieving a time stamp parameter corresponding to the retrieved answer;

determining a threshold time; and

comparing the time stamp parameter to the threshold time.

36. The method of claim 35 wherein determining a threshold time further comprises:

determining a threshold time according to one or more query factors, said query factors including a date of a flight, an origin of a flight, a destination of a flight, a time of flight, a day of week per flight, a size of the airplane, an actual answer to a completed query that matches the

seat availability query and an actual answer to a completed query that does not match the seat availability query.

37. The method of claim 28 wherein returning the retrieved answer as the predicted answer to the user's seat availability query further comprises:

determining that the retrieved answer from the cache database is stale;

returning the retrieved answer as the predicted answer where the predicted answer includes a confidence factor corresponding to the predicted answer; and

accepting the predicted answer, or not, based on the confidence factor.

38. The method of claim 37 wherein the confidence factor indicates the answer to the seat availability query is based on an actual answer received in response to an actual availability query.

39. The method of claim 37 wherein the confidence factor indicates the answer to the seat availability query is true or false to indicate availability, or not, of a predicted answer in the cache database.

40. The method of claim 37 wherein the confidence factor indicates the answer to the seat availability query is within a certain estimated probability.

41. The method of claim 37 wherein the confidence factor indicates a qualitative measure of seat availability.

42. The method of claim 37 wherein returning the retrieved answer as the predicted answer including a confidence factor corresponding to the predicted answer further comprises:

predicting the confidence factor from previously completed seat availability queries in response to a request for a confidence factor.

43. The method of claim 42 wherein predicting produces a confidence factor according to a model using historical booking data as a factor in the model.

44. The method of claim 43 wherein the historical booking data includes one or more categories for booking rates according to flights, booking rates according to families of flights sold on different dates, booking rates according to aircraft capacity, booking rates based on labor strikes, booking rates according to sales or other booking rates based on extraordinary events.

45. The method of claim 42 wherein predicting produces a confidence factor according to a model using as a factor in the model a threshold time, which if lapsed, indicates that the retrieved answer is considered stale.

46. The method of claim 45 wherein the threshold time varies over the lapsing of time.

47. The method of claim 45 wherein the threshold time is a pre-set time.

48. The method of claim 45 wherein the threshold time is a pre-set time approximately equal to the time an airline is expected to adjust parameters effecting seat availability distributions per booking code.

Claims 49-55 are canceled.

56. A computer program product residing on a computer readable medium for use by a travel planning system for providing a predicted answer in response to a seat availability query from a user, the computer program product comprising instructions for causing a computer to:

retrieve a stored query from a cache that stores seat availability queries and answers to seat availability queries stored from previously completed seat availability queries sent to revenue management systems;

determine whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query;

retrieve an answer corresponding to the stored query matching the seat availability query from the cache;

determine whether the retrieved answer is not stale; and, if the retrieved answer is not stale,

return the retrieved answer as the predicted answer to the user's seat availability query.

57. The computer program product of claim 56 further comprising instructions to:

store queries and answers from previously completed seat availability queries in the cache with the queries including at least one query fields of airline name, flight number, origination, destination, date of query, traveler nationality, point of purchase, frequent flyer status and seller data.

58. The computer program product of claim 56 further comprising instructions to:

store booking codes and booking counts for answers; and

assign a data parameter to the stored answer with the data parameters including at least one of time, date, source and user characteristics.

59. The computer program product of claim 56 wherein instructions to match, further comprises instructions to:

exactly match the query fields in the availability query to the query fields of a query stored in the cache database.

60. The computer program product of claim 56 wherein instructions to match, further comprises instructions to:

approximately match the query fields in the availability query to at least some of the query fields of a query stored in the cache database.

61. The computer program product of claim 56, further comprises instructions to:

send an actual availability query to an airline availability system that includes a revenue management algorithm and inventory management system if the retrieved answer is stale;

return the actual answer received from the airline availability system to the user; and

store the actual answer and query in the cache database of the availability predictor.

62. The computer program product of claim 56, wherein instructions to determine whether the retrieved answer is not stale further comprises instructions to:

retrieve a time stamp parameter corresponding to the retrieved answer;

determine a threshold time; and

compare the time stamp parameter to the threshold time.

63. The computer program product of claim 56 wherein instructions to determine a threshold time further comprises instructions to:

determine a threshold time according to one or more query factors, the query factors including a date of a flight, an origin of a flight, a destination of a flight, a time of flight, a day of week per flight, a size of the airplane, an actual answer to a completed query that matches the seat availability query and an actual answer to a completed query that does not match the seat availability query.

64. The computer program product of claim 56 wherein instructions to returning the retrieved answer as the predicted answer to the user's seat availability query further comprises instructions to:

determine that the retrieved answer from the cache database is stale;

return the retrieved answer as the predicted answer where the predicted answer includes a confidence factor corresponding to the predicted answer; and

accept the predicted answer, or not, based on the confidence factor.

65. The computer program product of claim 64 wherein the confidence factor indicates the answer to the seat availability query is based on an actual answer received in response to an actual availability query.

66. The computer program product of claim 64 wherein the confidence factor indicates the answer to the seat availability query is true or false to indicate availability, or not, of a predicted answer in the cache database.

67. The computer program product of claim 64 wherein the confidence factor indicates the answer to the seat availability query is within a certain estimated probability.

68. The computer program product of claim 64 wherein the confidence factor indicates a qualitative measure of seat availability.

69. The computer program product of claim 64 wherein instructions to return the retrieved answer as the predicted answer including a confidence factor corresponding to the predicted answer further comprises instructions to:

predict the confidence factor from previously completed seat availability queries in response to a request for a confidence factor, according to a model using historical booking data as a factor in the model.

70. The computer program product of claim 69 wherein instructions to predict produces a confidence factor according to a model using as a factor in the model a threshold time, which if lapsed, indicates that the retrieved answer is considered stale.

71. A computer system for providing a predicted answer in response to a seat availability query from a user, the computer system comprising:

a processor; and

a computer readable medium storing a computer program product comprising instructions for causing the computer to:

retrieve a stored query from a cache that stores seat availability queries and answers to seat availability queries stored from previously completed seat availability queries sent to revenue management systems;

determine whether at least some fields in the stored seat availability query either match or are substantially close in characteristics to corresponding fields in the user's seat availability query;

retrieve an answer corresponding to the stored query matching the seat availability query from the cache;

determine whether the retrieved answer is not stale; and, if the retrieved answer is not stale,

return the retrieved answer as the predicted answer to the user's seat availability query.

72. The computer of claim 71 wherein the computer program product further comprises instructions to:

store queries and answers from previously completed seat availability queries in the cache with the queries including at least one query fields of airline name, flight number, origination, destination, date of query, traveler nationality, point of purchase, frequent flyer status and seller data.

73. The computer of claim 71 wherein instructions to match in the computer program product further comprises instructions to:

exactly match the query fields in the availability query to the query fields of a query stored in the cache database.

74. The computer of claim 71 wherein instructions to match in the computer program product further comprises instructions to approximately match the query fields in the availability query to at least some of the query fields of a query stored in the cache database.

75. The computer of claim 71 wherein the computer program product further comprises instructions to:

send an actual availability query to an airline availability system that includes a revenue management algorithm and inventory management system if the retrieved answer is stale;

return the actual answer received from the airline availability system to the user; and

store the actual answer and query in the cache database of the availability predictor.

76. The computer of claim 7 1 wherein instructions to returning the retrieved answer as the predicted answer to the user's seat availability query further comprises instructions to:

determine that the retrieved answer from the cache database is stale;

return the retrieved answer as the predicted answer where the predicted answer includes a confidence factor corresponding to the predicted answer; and

accept the predicted answer, or not, based on the confidence factor.

77. The computer of claim 76 wherein the confidence factor indicates the answer to the seat availability query is based on an actual answer received in response to an actual availability query.

78. The computer of claim 76 wherein the confidence factor

indicates the answer to the seat availability query is true or false to indicate availability, or not, of a predicted answer in the cache database.

79. The computer of claim 76 wherein the confidence factor indicates the answer to the seat availability query is within a certain estimated probability.

80. The computer of claim 76 wherein the confidence factor indicates a qualitative measure of seat availability.

81. The computer of claim 76 wherein instructions to return the retrieved answer as the predicted answer including a confidence factor corresponding to the predicted answer further comprises instructions to:

predict the confidence factor from previously completed seat availability queries in response to a request for a confidence factor, according to a model using historical booking data as a factor in the model.

82. The computer of claim 81, wherein the instructions to predict, produces a confidence factor according to a model using as a factor in the model a threshold time, which if lapsed, indicates that the retrieved answer is considered stale.

Evidence Appendix

None.

Related Proceedings Appendix

None.